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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08.872,527	06.11.1997	YAJUN GUO	225.273	9637

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EXAMINER

DIBRINO, MARIANNE NMN

ART UNIT PAPER NUMBER

1644

35

DATE MAILED: 02/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/872,527

Applicant(s)

GUO, YAJUN

Examiner

DiBrino Marianne

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/24/02, 1/25/02 and 11/25/02.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 103, 107-124 and 126-143 is/are pending in the application.
- 4a) Of the above claim(s) 108, 109, 116, 117, 120, 138 and 139 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 103, 107, 110-115, 118, 119, 121-124, 126-137 and 140-143 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 25 filed 9/10/01 6) ☐ Other: _____

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DETAILED ACTION

1. Applicant's amendments filed 7/24/02 (Paper No. 31) and 1/25/02 (Paper No. 27) and Applicant's response filed 11/25/02 (Paper No. 34) are acknowledged and have been entered.

2. Applicant's election of the species of hepatocellular carcinoma cells, 4-1BB positive cells, antibodies against 4-1BB positive cells, TNF-alpha treated cells and INF-gamma treated cells and TNF-alpha and INF-gamma in Paper No. 34 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 103, 107, 110-115, 118, 119, 121-124, 126-137 and 140-143 read on the elected species enunciated above.

Claims 103, 107, 110-115, 118, 119, 121-124, 126-137 and 140-143 are currently being examined.

Accordingly, claims 108, 110, 116, 117, 120, 138 and 139 (non-elected species of Group I) are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to non-elected inventions.

The following are new grounds of rejection necessitated by the amendments filed 7/24/02 and 1/25/02.

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 103, 107, 110-115, 118, 119, 121-124, 126-137 and 140-143 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. This is a new matter rejection.

The amendatory material that is not supported by the specification and claims as originally filed is as follows: the claimed composition comprising "one or more primary or costimulatory T cell activation molecules on the surface of T cells in said patient mammal", i.e., the said molecules as a component of the claimed composition.

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5. Applicant is reminded of the Revised Interim Guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, ¶ 1 "Written Description" Requirement, Federal Register, Vol. 64, No. 244, pages 71427-71440, Tuesday December 21, 1999; the following rejection is set forth herein.

Claims 103, 107, 110-115, 118, 119, 121-124, 126-137 and 140-143 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

The specification does not provide adequate written description of the claimed invention. The legal standard for sufficiency of a patent's (or a specification's) written description is whether that description "reasonably conveys to the artisan that the inventor had possession at that time of the . . . claimed subject matter", *Vas-Cath, Inc. V. Mahurkar*, 19 USPQ2d 1111 (Fed. Cir. 1991). In the instant case, the specification does not convey to the artisan that the applicant had possession at the time of invention of the claimed composition comprising antibodies with "one or more antigen binding sites for antigen gp55" on the surface of one or more autologous target carcinoma or lymphoma cells. In addition, the instant claims encompass bridge molecules that bind to costimulatory molecules other than CD28 and 4-1BB. The instant claims also encompass bridge molecules that are not limited to bispecific monoclonal antibodies. The instant claims also encompass "one or more primary or costimulatory T cell activation molecules on the surface of T cells in said patient mammal" as a component of the claimed composition. There is insufficient disclosure in the specification on said composition and the components of said composition.

The specification discloses (on pages 9 and 10 at lines 23-27 and 10-13) that said binding sites can be directed towards 4-1BB, ICAM-1, ICAM-2, ICAM-3, LFA-1, LFA-2, VLA-1 VCAM-1, B7-1, B7-2 and other cell adhesion proteins and other cell surface proteins which can activate T cell costimulatory pathways through T cell surface proteins. The specification further discloses (on page 10 at lines 17-20) that said bridge molecules include, but are not limited to, bispecific monoclonal antibodies, fusion proteins, organic polymers and hybrids of chemical and biochemical materials and in addition (on page 11 at lines 11-27 and page 12 at lines 1-7) may be antigens, fatty acids, lipids, steroids and sugars that can stimulate or costimulate effector cells' function to destroy target cells, or may be one of the multitude of CD molecules listed on pages 11 and 12. The specification discloses bispecific antibodies CD28:gp55, CD28:gp95 and CD28:gp210 (figures and Example 6.2). The specification further discloses CD28:gp55 armed HEPA 1-6 (hepatoma tumor cells), EL-4 (lymphoma cells) or SMCC-1 (colon carcinoma cells) (Examples 6.2-6.7). The specification also discloses EL-4 tumor cell armed -Bi-Mab anti-gp115:anti-4-1BB (4-1BB is a glycoprotein expressed on primed T CD4+ and CD8+ T cells) (Example 6.8).

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The specification discloses (on page 10 at lines 26-27 and on page 11 at lines 1-10) that the antigen on the target cell serving as an anchor for the bridge molecule can be any molecule, including but not limited to, proteins, glycoproteins, lipids, glycolipids, phospholipids, lipid aggregates, steroids, and carbohydrate groups such as disaccharides, oligosaccharides and polysaccharides, and further, may be transferrin receptor, LDL receptor, gp55, gp95, gp210, ICAM-1, ICAM-2, collagen and fibronectin receptors, transferrin receptors, Fc receptor and cytokine receptors.

The specification discloses that the source of the tumor cells can include among others liver cancer, hepatocellular carcinoma, lung cancer, gastric cancer, colorectal carcinoma, renal carcinoma, head and neck cancers, sarcoma, lymphoma, leukemia, brain tumors, osteosarcoma, blade carcinoma, my[e]loma, melanoma, breast cancer, prostate cancer, ovarian cancer and pancreas carcinoma (page 8 at lines 18-27 and page 9 at line 1). The specification also discloses in vitro data on human hepatocellular carcinoma (Example 6.9).

The instant specification discloses (on page 5 at lines 23-27 and continuing on to page 6 at lines 1-14) that weakly or non-immunogenic autologous target cells are treated in order to amplify primary and costimulatory T cell activation signals in the cells, and bispecific monoclonal antibodies capable of binding to one or more antigens on the treated cells and to one or more T cell activation costimulatory molecules on the surface of T cells are attached. The instant specification discloses that target diseased cell is a cell causing, propagating, aggravating or contributing to a disease (page 8 at lines 18-20). The instant specification discloses (on pages 37-39 and 40-42) use of the invention to cause hepatoma tumor cell regression in mice and to cause tumor regression of EL-4 lymphoma and SMCC-1 colon carcinoma in mice, respectively. The specification further discloses that three monoclonal antibodies were produced which reacted with hepa 1-6 cells and recognized either a 55 kDa, 95 kDa or 210 kDa glycoprotein expressed on most tumor cells as determined by immunoprecipitation. The specification discloses that the said monoclonal antibodies were designated as anti-gp55, anti-gp95 and anti-gp210, respectively (page 32 at lines 8-20). The specification also discloses that bispecific monoclonal antibodies were produced from these antibodies (page 33 at lines 4-6).

The specification does not appear to disclose the claimed composition comprising "one or more primary or costimulatory T cell activation molecules on the surface of T cells in said patient mammal", i.e., the said molecules in the claimed composition.

In claims involving chemical materials, generic formulae usually indicate with specificity what the generic claims encompass. One skilled in the art can distinguish such a formula from others and can identify many of the species that the claims encompass. Accordingly, such a formula is normally an adequate description of the claimed genus. However, a generic statement such as "gp55" and "bridge molecule", without more, is not an adequate written description of the

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genus because it does not distinguish the claimed genus from others, except by the property of being a glycoprotein of 55 kDa size in the case of "gp55" and by the property of being a bridge molecule, respectively. It does not specifically define any of the glycoproteins that fall within its definition in the case of "gp55" and it does not define any structural features commonly possessed by members of the genus that distinguish them from others, other than size. It does not specifically define any of the bridge molecules that are not one of the four disclosed bispecific antibodies. One skilled in the art therefore cannot, as one can do with a fully described genus, visualize or recognize the identity of the members of the genus. Many such species may be 55 kDa in size, or may act as a bridge molecule, respectively. The description requirement of the patent statute requires a description of an invention, not an indication of a result that one might achieve if one made that invention. See *In re Wilder*, 736 F.2d 1516, 1521, 222 USPQ 369, 372-73 (Fed. Cir. 1984) (affirming rejection because the specification does "little more than outlin[e] goals appellants hope the claimed invention achieves and the problems the invention will hopefully ameliorate."). Accordingly, naming a type of material generally known to exist, in the absence of knowledge as to what that material consists of, is not a description of that material.

Since the disclosure fails to provide sufficient relevant identifying characteristics that identify members of the genus, and given the broad genus claimed, the disclosure of an antibody to a protein of 55 kDa on the surface of one type of hepatocellular carcinoma cell line is insufficient to describe the genus as broadly claimed, as is the disclosure of four bridge molecules that are all bispecific antibodies, as is the lack of disclosure of one or more primary or costimulatory T cell activation molecules on the surface of T cells of said patient mammal as a component of the claimed composition. One of skill in the art would not have recognized that Applicant was in possession of the invention claimed in the instant claims.

Applicant's arguments in the amendment filed 1/25/02 have been fully considered but are not persuasive.

It is Applicant's position beginning on page 4 of the said amendment that gp55 is not in claim 103 as amended, and the claimed invention does not therefore claim a specific antigen or isolation of a specific antigen. It is Applicant's further position that *Fiers v. Suga* recognizes that a chemical material can be claimed by means of a process, and hence, the written description requirement for the claimed antigen binding site is satisfied because the chemical identity of the claimed antigenic binding site is described by the process of isolating an antibody that binds specifically to the surface of a carcinoma or lymphoma cell.

It is the Examiner's position that although claim 103 no longer recites "gp55", instant claims 129, 131 and 141 do, and that the disclosure of an antibody to a protein of 55 kDa on the surface of one type of hepatocellular carcinoma cell line is insufficient to describe the genus as broadly claimed. It is the Examiner's further position that the written description requirement for "bridge molecule" as broadly claimed and "one or more primary or costimulatory T cell

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activation molecules on the surface of T cells of said patient mammal" as a component of the claimed composition are not met for the reasons of record supra.

6. Claims 103, 107, 110-115, 118, 119, 121-124, 126-137 and 140-143 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not disclose how to make and/or use the instant invention. The claimed composition comprising one or more isolated autologous target carcinoma or lymphoma cells, one or more antibodies comprising one or more binding sites for one or more "gp55" antigens on the surface of one or more of the autologous target carcinoma or lymphoma cells, a "bridge molecule" and "one or more primary or costimulatory T cell activation molecules on the surface of T cells in said patient mammal" encompasses: (1) making and using antibodies to any 55 kDa glycoprotein, i.e., "gp55", on the surface of any isolated autologous target autologous target carcinoma or lymphoma cells, and (2) making and using a composition comprising a bridge molecule that is not a bispecific antibody, and (3) making and using a composition further comprising one or more primary or costimulatory T cell activation molecules on the surface of T cells in said patient mammal". The specification has not enabled the breadth of the claimed invention in view of the teachings of the specification because the claims encompass a composition which comprises an antibody with a specificity against any 55 kDa cell surface protein on an isolated autologous target cell recited in the instant claims and/or a bridge molecule that is not a bispecific antibody, and "one or more primary or costimulatory T cell activation molecules on the surface of T cells in said patient mammal". The state of the art is such that it is unpredictable in the absence of appropriate evidence whether the claimed compositions can be made and/or used.

The specification discloses working examples of compositions comprising HEPA 1-6 hepatocellular carcinoma cells, EL-4 lymphoma cells and SMCC-1 colon carcinoma cells, said cells being armed with anti-CD28:gp55 monoclonal antibody (Examples 6.2-6.7) and use in mice.

The instant specification discloses (on page 5 at lines 23-27 and continuing on to page 6 at lines 1-14) that weakly or non-immunogenic autologous target cells are treated in order to amplify primary and costimulatory T cell activation signals in the cells, and bispecific monoclonal antibodies capable of binding to one or more antigens on the treated cells and to one or more T cell activation costimulatory molecules on the surface of T cells are attached. The instant specification discloses that "target diseased cell" is a cell causing, propagating, aggravating or contributing to a disease (page 8 at lines 18-20). The instant specification discloses (on pages 37-39 and 40-42) use of the invention to cause hepatoma tumor cell regression in mice and to cause tumor regression of EL-4 lymphoma and SMCC-1 colon carcinoma in mice, respectively. The specification further discloses that three monoclonal antibodies were produced which reacted with hepa 1-6 cells and recognized either a 55 kDa, 95 kDa or 210

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kDa glycoprotein expressed on most tumor cells as determined by immunoprecipitation. The specification discloses that the said monoclonal antibodies were designated as anti-gp55, anti-gp95 and anti-gp210, respectively (page 32 at lines 8-20). The specification also discloses that bispecific monoclonal antibodies was produced from these antibodies (page 33 at lines 4-6).

The specification does not appear to disclose "one or more primary or costimulatory T cell activation molecules on the surface of T cells in said patient mammal" as a component of the claimed composition.

The specification does not disclose that the said monoclonal antibody against a 55 kDa glycoprotein on HEPA 1-6 cells is readily available to the public, nor does the specification disclose a repeatable method for obtaining the said monoclonal antibody. It is apparent that the said antibody is required to practice the claimed invention. As a required element, it must be known and readily available to the public or obtainable by a repeatable method set forth in the specification. There is no disclosure in the specification of the particular epitope, nor the sequence of the protein recognized by the said antibody, and therefore a routineer would not be able to produce said antibody based on the disclosure of the specification. If the said antibody is not so obtainable or available, the enablement requirements of 35 USC 112, first paragraph, may be satisfied by a deposit of the hybridoma producing the said antibody. See 37 CFR 1.802.

Evidentiary reference Periera et al (of record) teach "GP55" which is a viral envelope glycoprotein from SFFV (spleen focus forming virus) required for leukemogenicity (especially page 5106), i.e., the "GP55" of Periera et al is an example of a viral glycoprotein that is tumorigenic and is of the same size as the "GP55" protein on the surface of HEPA 1-6 cells in the instant specification, but which may be a different glycoprotein.

There is insufficient guidance in the specification as to how to make and/or use the instant invention, including reliance on a monoclonal antibody made to a glycoprotein of 55 kDa on the surface of the HEPA 1-6 hepatocellular carcinoma cell line, including a bridge molecule that is not a bispecific antibody, and including "one or more primary or costimulatory T cell activation molecules on the surface of T cells in said patient mammal" as a component of the claimed invention. Undue experimentation would be required of one skilled in the art to practice the instant invention. See In re Wands 8 USPQ2d 1400 (CAFC 1988).

Applicant's arguments in the amendment filed 1/25/02 have been fully considered but are not persuasive.

It is Applicant's position in the said amendment beginning on page 5 that the monoclonal antibody is known and readily available to the public. Applicant points to page 10 of the specification. It is Applicant's further position that prophetic examples disclosed by the specification on page 7 are based on working examples in mice disclosed on pages 19-29 of the instant specification amply enable the claimed invention for treating cancer in humans or in any

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mammal, as in *Atlas Powder Co. v. E.I. du Pont de Nemours & Co.*, 750 F.2d 1569 (Fed. Cir. 1984).

It is the Examiner's position that page 10 of the specification does not disclose antibodies to gp55 on the surface of HEPA 1-6 hepatocellular carcinoma cell line is known and readily available to the public. It is Examiner's position that the working examples of compositions comprising HEPA 1-6 hepatocellular carcinoma cells, EL-4 lymphoma cells and SMCC-1 colon carcinoma cells, said cells being armed with anti-CD28:gp55 monoclonal antibody (Examples 6.2-6.7) for use in mice are limited to a particular bridge molecule that is a bispecific antibody, and "one or more primary or costimulatory T cell activation molecules on the surface of T cells in said patient mammal" is not a component of the said compositions disclosed in the working examples. It is the Examiner's further position that the prophetic examples referred to by Applicant are not enabling, that the said prophetic examples are not based upon slightly modified actual experiments.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 103, 107, 110-115, 118, 119, 121-124, 126-137 and 140-143 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claims 107, 114, 121-124, 126, 128 and 114 recite the limitation "said one or more hepatocellular carcinoma, lymphoma or colorectal carcinoma cells". There is insufficient antecedent basis for this limitation in the claim.

b. Claims 110-114 recite the limitation "said one or more CD28 or 4-1BB molecules". There is insufficient antecedent basis for this limitation in the claims.

c. Claims 112 and 113 recite the limitation "said one or more hepatocellular carcinoma, or colorectal carcinoma cells". There is insufficient antecedent basis for this limitation in the claim.

d. Claims 118, 128 and 131 recite the limitation "said one or more target hepatocellular carcinoma, lymphoma or colorectal carcinoma cells". There is insufficient antecedent basis for this limitation in the claim.

e. Claims 110-114, 130 and 132 recite the limitation "said one or more CD28 or 4-1BB molecules". There is insufficient antecedent basis for this limitation in the claim.

f. Claim 143 is indefinite in the recitation of "bridge molecule further comprises bispecific monoclonal antibody" because it is not clear what is meant, i.e., is the bridge

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molecule a bispecific monoclonal antibody? In addition, the article "a" appears to be missing after "comprises".

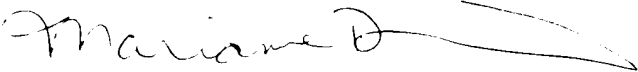
g. Claims 129, 131 and 141 are indefinite in the recitation of antibodies which comprise "two or more" or "one or more" "antigen binding sites for one or more gp55 antigens on the surface of said one or more target hepatocellular carcinoma, lymphoma or colorectal carcinoma cells" or "one or more binding sties for antigen gp55" because the characteristics of the said gp55 antigens and hence, that of the said antibodies, are not known. The use of "gp55" as the sole means of identifying the protein to which the claimed antibody is specific renders the claim indefinite because "gp55" is merely a laboratory designation which does not clearly define the claimed product, since the said designation is merely a characterization of a protein by size and may refer to many different proteins.

9. No claim is allowed.

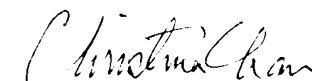
10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne DiBrino whose telephone number is 703-308-0061. The examiner can normally be reached on Monday and Thursday from 11 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Chan, can be reached on (703) 308-3973. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.



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